Restricted

NAVY DEPARTMENT

BUMED NEWS LETTER

a digest of timely information

EDITORS - CAPTAIN W. W. HALL, (MC) U. S. N.
COMDR. F. R. BAILEY, (MC) U. S. N. R.

Vol. 3 Friday, February 4, 1944 No. 3

TABLE OF CONTENTS

* * * * * *

Nutritional Aspects of Convalescent Care: Following a Conference on November 16, 1943, called in response to the Surgeon General's letter requesting information regarding parenteral nitrogen therapy, the Committee on Convalescence and Rehabilitation of the National Research Council, requested Dr. J. P. Peters, Yale University, and Dr. Robert Elman, Washington University, to draw up a report embodying methods of treatment which are capable of diminishing the catabolic effects of illness and, therefore, of shortening the duration of convalescence. This report was presented at a meeting on December 17, 1943, and then modified by the authors and the Committee to its present form. The report follows:

"It may be assumed that the soldier or sailor who has subsisted on normal rations of his Service is in an excellent nutritional state up to the time he becomes disabled by illness or injury. Exceptions must be made of men who, because they were isolated when they incurred their disability, had not received full rations.

"As soon as injury or disease occurs, malnutrition almost always begins. This is the result of two processes: first 'toxic destruction of protein', i.e., the direct effect of disease or injury in promoting destruction of tissues; second, diminished intake of food, because of inability or disinclination to eat. Both of these processes bear some relation to the severity of the injury or disease.

"Although some wastage of tissue can be tolerated and has no easily demonstrable effect on strength and efficiency, the extent of such 'harmless' deficiency is ill-defined. There is ample evidence that any considerable nutritional deficiency is distinctly harmful: it first reduces tolerance for exceptional exertion; in its most severe form it is altogether incapacitating. Even a mild degree of malnutrition should, therefore, be prevented because, though its evil effect may be undetectable, it marks a step towards incapacity and each step makes physical efficiency more precarious.

"The 'toxic destruction of protein' can be alleviated only by effective treatment of the disease or injury from which it originates. Its evil effects are, however, exaggerated by inadequate dietary intake. Wasting from this cause can be prevented in a large proportion of patients and even 'toxic destruction of protein' may be reduced by the effective administration of fluid and food in proper quantities and proportions. In addition, by improving the general state of health these measures promote and shorten the processes of repair.

"Attention is likely to be given to the dietary needs of those who are suffering from serious diseases and injuries - although it may not always be wisely directed. From a military standpoint more man-days could be gained by accelerating the recovery of those with less grave conditions who may be rapidly returned to active service. Every effort should be made, therefore, to prevent malnutrition and minimize wasting in acute or minor casualties as well as in men with more serious disabilities.

"The average medical officer is so preoccupied with the specific treatment of the disease or injury which confronts him that he is prone to overlook details of dietary management, especially when there are no urgent indications. In addition, even if he has the best will in the world he may be insufficiently acquainted with fundamental principles of nutrition. For both these reasons it would be well, in hospitals with a sufficiently large staff, to place the responsibility for general supervision of dietary management and nutrition of patients upon a particular member or members of the medical staff of the hospital.

These nutritional medical officers should not order diets for all patients in the hospital. They should rather act as instructors and consultants to the medical officers in charge of wards and should see that good dietary principles are observed throughout the hospital.

"The general principles that may be expected to mitigate wasting and to accelerate recovery of patients are outlined below.

General Principles

'Food offered to a patient is of no value unless it is eaten. The amount of food consumed should be ascertained. If food is not eaten, the reasons must be learned and, if possible, corrected. Anorexia must be regarded as a challenge, not as an inevitable and irremediable consequence of disability. Although patients should be encouraged to eat as varied a diet as possible, idiosyncrasies cannot be altogether neglected. Failure to eat may arise from physical weakness, exhaustion, or the fact that the necessary motions are painful. It may be necessary to feed patients under these conditions. Fluid or semisolid diets may be essential for seriously ill patients. In the absence of gastrointestinal disturbances patients who will drink freely can usually be given adequate protein and calories in the form of fluids if advantage is taken of the sense of thirst. This sense should not be too much dulled by water and non-nutrient fluids; nutrient fluids should be made available to quench it. Thirst may be stimulated by the intelligent use of salt (see below). But fluid or semisolid diets should not be continued if the patient is able to take solid food, because they are not conducive to appetite. The chief reason for giving fluids, semisolids and soft foods to the sick is to relieve them of the work of cutting or masticating the foods. All foods become liquid in the gastrointestinal tract, except milk, which first coagulates in the stomach. In some conditions frequent feedings are desirable; in this case the total diet is best divided equally into the required number of meals. Intermediate feedings (between meals of a regular dietary) may only spoil the appetite for the regular meals. Night feedings, shortly before sleep, are usually well tolerated; high calory feedings, instead of the usual light fluids, may be given to advantage at this time.

"Whenever possible, the patient should eat his necessary food in the normal way. It is not only unnatural, but laborious for the doctor and distressing to the patient, to meet all dietary requirements by means of other devices. Tube feeding or parenteral injection should not be employed merely as a means of evading the difficulties which arise from simple anorexia.

Dietary Essentials

"Water. Enough water must be given to provide for insensible and sensible perspiration and for the production of sufficient urine to enable the patient to excrete the waste products that must be eliminated, without depleting the

essential water-stores of the body. Loss of water by the skin varies with the environmental temperature and the total caloric expenditure. The best criteria of an adequate water supply are:

a) the volume of urine, which should not fall below 1000 c.c. in febrile patients.

b) the specific gravity of the 24-hour urine, which should not exceed 1.020.

c) the elasticity of the skin and subcutaneous tissues, dryness of the tongue and the subjective sensations of the patient.

"Forcing fluids, i.e., inducing a patient to take uncomfortably large quantities of water, is seldom indicated. It is tiring and distressing to the patient and often impairs appetite. If a large intake is necessary, enough salt should be given to promote thirst.

"Salt. Animals derive their sodium salts almost entirely from sodium chloride added to their food. If the sodium salts of the body become depleted water is not properly retained and dehydration results. In addition sodium deficiency promotes circulatory failure. Patients with sodium depletion lose thirst, appetite and strength. If the sodium deficit becomes great, circulatory collapse may supervene.

"Normal kidneys conserve sodium and chloride most efficiently. Chloride practically disappears from the urine as soon as its concentration in the serum falls appreciably below normal. If the urine contains little or no chloride (that is, yields little precipitate when treated with silver nitrate), it may be presumed that there is a salt deficiency. An exception must be made of patients with gross renal insufficiency, lobar pneumonia, advanced chronic tuberculosis and other destructive pulmonary diseases. In these conditions the kidneys do not retain their normal capacity to conserve salt. Consequently, urinary chloride excretion may continue after serum chloride has fallen below normal limits.

"The insensible perspiration (fluid lost through the lungs and by the skin without sweating) amounts to 1000 to 1500 c.c. and contains no salt. Sweat and exudates do contain salt that must be replaced. The stomach has no regard for the salt content of the body. Vomiting causes loss of salt, which does not cease even when serum sodium and chloride are depleted. Administration of water (ice is water) by mouth in the face of persistent vomiting only washes salt from the body and enhances dehydration, as does continuous gastric suction and lavage.

"All persons, unless they have congestive heart failure or nephritis with edema, should receive at least 5 Gm. of sodium chloride daily.

The average normal diet contains more than this. If, however, patients do not eat enough of their diets or subsist chiefly or entirely on simple fluids containing only carbohydrate, extra salt should be given. This may be introduced in broth, tomato juice, or even milk and fruit juices. Administration of adequate amounts of salt will often increase the intake of both food and fluid, by creating appetite and thirst. Salt-depleted patients will not eat or drink well.

"Protein is indispensable: it cannot be replaced by any other food. A normal subject, starving, wastes about 1 Gm. of tissue protein per kg. of body weight per day. This wastage can be reduced to 0.3 to 0.5 Gm. by the administration of high calories in the form of carbohydrate and fat; it cannot be prevented entirely. Moderate amounts of carbohydrate alone will reduce protein wastage considerably. In acute febrile diseases and after serious injuries protein wastage may rise to 3 or more Gm. per kg. of body weight per day. This can be reduced only slightly by feeding carbohydrate. There is evidence that the lost tissue protein can be partly or wholly replaced and consequently that wasting can be mitigated or prevented by the administration of large amounts of protein and sufficient amounts of carbohydrate and fat to provide for the caloric requirements of the patient. This is a matter of great importance since wastage of tissue protein sacrifices the substance of liver and other important organs. It also results in depletion of serum proteins which ultimately leads to nutritional edema.

"Every effort should be made to prevent this wastage by administration of high protein diets. For this purpose milk and eggs (the latter preferably cooked) may be used if patients are unable to take solids. Ground meats may, however, be given earlier and more freely than is generally believed.

"Diets for sick or injured persons should contain 100 Gm. or more of protein daily. Nothing less than 1 Gm. of protein per kg. of body weight per day can be regarded as a safe subsistence ration for a normal adult.

"Carbohydrate. A small amount of carbohydrate, perhaps 100 Gm. per day, is required to prevent ketosis in man. If this is not given protein is broken down to provide carbohydrate. Granted sufficient protein and this minimum of carbohydrate, well-nourished subjects can derive most of the additional calories needed from body fat without serious injury.

"Fat is, therefore, the least essential element of the diet in acute disease. Indeed, fat is the only dispensable body store of food. In prolonged wasting conditions, however, fat deposits may become exhausted. It is, therefore, advisable to prevent excessive loss of fat by giving high calories. For this purpose fat itself is peculiarly suited because it provides the greatest number of calories in the smallest bulk. The digestive system of most ill or injured persons tolerates, digests and absorbs fat well, if it is given in palatable form with suitable carbohydrate vehicles. Nevertheless, if there is a limitation of the amount of food a patient can take, it is far better to give precedence to protein.

"Vitamins. Starving animals appear to develop no vitamin deficiencies because they derive adequate vitamins in suitable proportions from their tissues. In any case vitamin deficiencies develop only after considerable periods on inadequate diets. The utilization or excretion of certain vitamins may be specifically increased by particular diseases, especially those which accelerate metabolism. Nothing is as effective in preventing vitamin deficiencies as a generous mixed diet. Although complete vitamin mixtures for parenteral use are not available, the most important vitamins may be given readily. Complete oral mixtures of vitamins, especially Brewers' yeast and other satisfactory preparations of Vitamin B elements, when given in adequate quantities may destroy appetite for food. They should, therefore, be used with caution as supplements to diets.

"From this discussion it is clear that, although the essentiality of the dietary items varies with different clinical situations, a priority list may be drawn up using as a basis the degree to which deprivation harms the organism.

	MINIMUM NEED	AVERAGE REQUIREMENT in sick patient
1) Water..................	2,000	3,000 c.c.
2) Salt.....................	5	10 Gm.
3) Protein................	75	100-150 "
4) Carbohydrate........	100	100-300 "
5) Fat) - see discussion		
6) Vitamins)		
7) Calories (variable)		

"In patients well nourished prior to the onset of their disability and undergoing short illnesses, no serious harm develops from failure to maintain a high calory or fat intake, since the necessary calories will be derived from body fat if the minimum requirements for water, salt, protein and carbohydrate are met. When the illness is long drawn out, fat stores may be depleted. The maintenance of adequate caloric intake then changes from a merely desirable part of therapy to a matter of urgent importance.

"When a patient had ample stores of vitamins before becoming sick, special efforts to supply these essential elements is not necessary during most acute illnesses. If the patient has been previously depleted of vitamins, or if intake of a balanced diet is impossible over a long period of time, provision for vitamin administration must be made.

Tube Feeding

"Feeding by stomach tube is not satisfactory. In unconscious patients the danger of introduction or aspiration of food mixtures into the lungs is present. However, there are clinical situations in which tube feeding is the only practicable means of combating serious malnutrition.

"In general, it should never be used until an honest effort has been made to have the patient eat. This includes provision of palatable food of a type most appealing to the patient, and some personal attention by the physician to overcoming the patient's anorexia. When gavage is used, it should always be done as a temporary expedient with the patient's full knowledge that it will be discontinued as soon as he eats an adequate amount.

"The material inserted through a feeding tube should always be warmed to body temperature. Large volumes and rapid rates of injection should be avoided. The material should be concentrated, and should contain the necessary amounts of salt and protein, as well as carbohydrate and fat for the provision of caloric needs. Casein hydrolysates in powdered form constitute a convenient way to administer the necessary protein, especially in the presence of diarrhea.

Parenteral Feeding

"Parenteral injections are to be looked upon as temporary substitutes for normal eating. They should never be resorted to in the absence of specific indications for their use and should never be regarded with complacency. However, all physicians are familiar with the great benefits which have accrued from the availability of methods for the parenteral administration of water and salt to patients unable to take these essential substances by mouth. Under many circumstances the provision of nutrient materials parenterally has as great importance for the welfare of the patient as has the parenteral administration of fluid.

"Parenteral feedings should be planned always with the view of introducing, in the smallest practicable volume of fluid, in the shortest time, the quantities and proportions of materials required to meet the needs of the recipient as they have been outlined above. Administration of excessive amounts of fluid over unnecessarily long periods distresses and exhausts patients and wastes material and the time of attendants.

"Water is the vehicle for all parenteral nutrient materials. At times, however, it may be necessary to give some water in addition to the amounts required for solvent purposes. In this case, since pure water cannot be injected, glucose solution must be used. The glucose is burned, providing calories, while the water is left in the body. The proportions of sugar and water may be varied in accordance with the needs for these two constituents.

"Enough water should be given to replace water lost by insensible and sensible perspiration, vomiting, diarrhea, and exudation,and in addition sufficient to provide 1000 c.c. of urine (1500 c.c. if there is high fever and reason to suspect excessive toxic destruction of protein). It is impossible to state with accuracy the exact amount needed, because of the wide variation under different clinical conditions. However, when a patient is unable to take any

fluid by mouth, his minimum requirements will rarely be less than 2000 c.c. per day, and will usually be 3000 c.c. or more. This insures a reasonable margin of safety.

"Salt. The salt requirements of an individual can be adequately supplied over moderate periods of time by isotonic solutions of sodium chloride. The ratio of chloride to sodium is higher in such solutions than it is in body fluids; but if enough is given to produce an adequate volume of urine, the kidneys will excrete the excess chloride, while retaining sodium to form the necessary bicarbonate. Sufficient potassium, magnesium, calcium and phosphate will be obtained from destruction of tissues.

"A minimum of 5 Gm. of sodium chloride a day should be given to all patients. Febrile subjects or persons who sweat excessively should receive additional amounts. In case of vomiting enough should be given to replace salt lost in the vomitus. In subjects receiving water by mouth, vomitus may be estimated to contain the equivalent of about 5 Gm. of sodium chloride per liter. In subjects receiving no water by mouth, fluid lost by vomiting should be replaced by an equal volume of saline. If the patient has become dehydrated by vomiting before treatment is instituted, enough saline should be given at the onset of therapy to repair the deficit; this may require as much as ten liters of salt solution.

"In addition to the saline sufficient water should always be given in the form of glucose solution to provide for the insensible perspiration which contains no salt. This amounts usually to from 1000 to 1500 c.c. daily, depending on the size and metabolism of the subject.

"Glucose. A certain amount of carbohydrate is required to prevent ketosis and to mitigate nitrogen loss. Glucose solution also permits the administration of appropriate amounts of water without salt. As little as 100 Gm. of glucose a day will prevent the gross ketonuria of starvation (i.e., excretion of enough ketones to yield positive nitroprusside tests in the urine), but will not prevent rise of ketone bodies in the blood. It is better to give glucose in two doses than one, in order to insure continuous utilization. To provide enough calories to minimize protein wastage more than 100 Gm. daily is required.

"Only 5 per cent glucose should be used subcutaneously. Concentrations of from 5 to 50 per cent may be injected intravenously. It is generally held that solutions stronger than 10 per cent should be used only in small quantities in conditions of emergency, because such solutions are likely to cause venous thrombosis. Concentrations as great as 15 per cent may, however, be used if they are introduced slowly enough and if there is a free flow of blood in the vein into which they are injected. A free flow of blood and slow introduction of fluid dilutes the solution at the point of injection to an innocuous concentration.

"Glucose can be added to solutions of salt and to protein hydrolysates without consideration of its osmotic contribution, provided it is injected so slowly that the glucose is utilized as rapidly as it enters the body.

"Protein may be given as transfusions of whole blood, plasma, hydrolyzed protein or mixtures of amino acids.

"Transfusion of whole blood and infusion of normal or concentrated plasma are not ordinarily thought of as nutritional measures. They are used for maintaining blood volume and circulation. Every 100 c.c. of normal blood contains about 15 Gm. of hemoglobin and 4 Gm. of plasma protein. Hemoglobin is not suitable for replacement of tissue protein. However, injected plasma protein is metabolized to some extent and so provides a source of nitrogen nourishment and protects, in part at least, against tissue wastage.

"Solutions of hydrolysates of casein, or other high grade proteins, have recently been employed and represent a more nearly physiological method of providing nitrogenous food parenterally, because food protein is normally hydrolyzed before absorption. Of the various hydrolysates available there is only one, Amigen, (Mead Johnson) which is well utilized and will maintain nitrogen equilibrium. Amigen is prepared by enzymatic hydrolysis of casein. Acid hydrolysates should have certain theoretical advantages. Up to the present time it has been impossible to produce acid hydrolysates without destroying certain essential amino acids, notably tryptophane. Since means of circumventing this oxidation have been devised, satisfactory acid hydrolysates may become available. Mixtures of pure amino acids suitable for injection (Merck and Co.) have definite advantages, but they are expensive and are not yet available in large quantity.

"It has been demonstrated that the nitrogen requirements of animals and patients may be supplied for long periods by infusions of Amigen and pure amino acid mixtures. Like all other parenteral methods of feeding, however, this must be regarded as a temporary substitute for normal eating. It is a procedure, moreover, that requires meticulous attention to detail.

"Amigen is usually prepared in 5 per cent concentration dissolved in 5 per cent glucose solution; when neutralized to a pH of 6.5, a liter of this solution contains 5 grams of sodium chloride. A liter of the solution contains the equivalent of 50 Gm. of protein. Between 1.5 and 2 liters per day are, therefore, required to meet the basic demands of a normal man for protein. If solutions of Amigen are properly prepared they should provoke no pyrogenic reactions. If injected too rapidly (faster than 500 c.c. of the 5 per cent solution per hour), nausea or vomiting may be induced.

"Fat. There is at present no preparation of fat for intravenous injection available. Such preparations are feasible, and have been made and used in emulsions up to 30 Gm. of fat per 100 c.c. The fat emulsions would have great theoretical value in any situation in which maintenance of a high caloric intake by parenteral injection is indicated, since each 100 c.c. of a 30 per cent fat emulsion would provide 270 calories.

"Vitamins. For short periods vitamins are not required, especially if the patients are not extremely malnourished. However, there are available preparations of certain vitamins suitable for parenteral use, which may be given to patients who cannot eat. If these are administered, the following doses are recommended: thiamine (B_1) 10 mg., riboflavin (B_2) 5 mg., niacine 20 mg., and vitamin C 100 mg.

General Directions for Parenteral Feeding

"It is best to plan in advance the quantities of water and other constituents that will be required for the day, the times at which they are to be given and the routes by which they are to be administered. The total amounts of each component should first be estimated, after which they are translated into terms of parenteral materials that are available. Efforts should be made to use no more water than the patient requires.

"Only isotonic solutions should be given subcutaneously: that is, normal saline or 5 per cent glucose. The intravenous route is to be preferred to the subcutaneous for glucose solutions, since glucose tends to abstract water from the tissues at first because it diffuses more slowly than salt does. Saline solutions should not be reinforced with glucose for subcutaneous injection because this makes a hypertonic solution. Glucose can be added, as desired, to intravenous solutions because it is consumed, leaving only water. The temporary osmotic effect it produces is negligible or may be advantageous. If it is impossible to prepare the solutions fresh, according to prescription, the desired concentration of glucose may be made up by the addition of the required amount of sterile 50 per cent glucose from ampoules.

"Solutions no stronger than 10 per cent of glucose can be administered at the rate of 9 c.c. or about 150 drops per minute. If 15 per cent glucose solution is used the rate should be reduced to 6 c.c. or about 100 drops per minute. As a further precaution against venous thrombosis, the smallest possible needle (22 to 26) with a short bevel should be used, and care should be taken that it is held in place in such a way that the blood flow in the vein is not obstructed.

"The Amigen solutions can be made up in 10 per cent concentration in saline, which can be diluted to 5 per cent with glucose or saline solutions. Amigen solutions prepared from the powder have a pH of about 5.0. They should be brought to a pH of 6.5 by the addition of sodium hydroxide before use.

Examples

"1. It is desired to provide, for a period of one day, water, salt and enough glucose to prevent gross ketosis in a non-febrile patient who is unable to eat or drink, but is not vomiting or sweating, and who has no large, exposed exuding surface.

Water..1500 to 2000 c.c.
Salt...5 to 6 Gm.
Glucose...100 Gm.

1000 to 1200 c.c. of 10 per cent glucose and 500 to 800 c.c. of normal saline will meet these requirements closely enough. The total amount selected should preferably be given in two equal installments.

"2. If there has been a large antecedent deficit of salt as a result of vomiting, sweating or transudation, the proportions of salt may be increased.

For example:

Water..3000 c.c.
Salt...27 Gm.
Glucose...100 Gm.

In this case 100 Gm. of glucose or 200 c.c. of 50 per cent glucose are added to 3 liters of normal saline and divided into two portions in the same manner.

"3. To meet the requirements for nutrition of a patient who will be unable to take any food or fluids at all for some days and therefore should receive protein.

Water..3000 c.c.
Amigen..100 Gm.
Glucose...300 Gm.
Salt...10 Gm.

This will require 2 liters of 5 per cent Amigen - 5 per cent glucose solution and 1 liter of 10 per cent glucose solution, a total of 3000 c.c. Since the Amigen is neutralized it will contain 5 grams of salt per liter or 10 grams in 2 liters.

Other convenient formulae can be devised by which the volume can be kept below 3000 c.c. The selected amount of solution should be injected over a period of about 4 hours or, preferably, in two equal installments of 2 hours each."

* * * * * *

Antimeningococcus Serum and Meningococcus Antitoxin to be Dropped from New and Nonofficial Remedies: The Council on Pharmacy and Chemistry of the American Medical Association has voted to omit antimeningococcic serum and meningococcus antitoxin from New and Nonofficial Remedies. (J.A.M.A., Jan. 8,'44)

The conclusions reached were identical with those expressed in a letter from Dr. H. A. Reimann to the Surgeon General and published in the Bumed News Letter of November 26, 1943.

It is the opinion of the Council that there is no evidence to prove that combined chemo-sero-therapy is superior to chemotherapy alone and no evidence now available to support the use of the meningococcus antitoxic serum.

* * * * * *

Intracranial Local Sulfonamide Therapy: Meacham et al conducted experiments, using dogs, designed to determine whether or not serious damage to the brain might result from the local application of the various sulfonamides. The drugs were applied at operation in varying amounts and by various methods directly to the cerebral cortex.

The authors' conclusions are as follows:

Important clinical results were the production of convulsions by sulfathiazole (when placed on the intact cerebral cortex) and of pleocytosis by all three of the drugs.

Significant pathologic effects were: (1) immediate acute pachymeningitis and leptomeningitis, with corresponding subacute or chronic inflammation in the later stages; (2) marked fibroplasia in the dura; (3) conspicuous gliosis in the cortex, and (4) varying degrees of neuronal degeneration, proliferation of oligodendrogliocytes and metamorphosis of microglia cells.

All reactions were least extensive when sulfanilamide was employed and increased with all the drugs when the dose was increased.

These experiments do not indicate that the effects of sulfanilamide and sulfadiazine are sufficiently harmful to contraindicate their critical use in the therapy of intracranial infections. They suggest that sulfathiazole should never be employed in a cranial wound in which there is an opening in the dura. (Arch. Neurol. and Psychiat., Dec. '43.)

* * * * * *

St. Louis Encephalitis Transmitted by Mosquitoes: As the result of carefully conducted experiments by Hammon and Reeves, it would appear that the evidence is now incontrovertible (a) that Culex tarsalis, Culex pipiens and several less common species of mosquitoes play an important part in the transmission of St. Louis encephalitis virus in our western states; (b) that domestic fowls may serve as reservoir hosts for St. Louis encephalitis virus while having a symptom-free viral septicemia. (J. Exper. Med., Oct. '43.)

Blast: "Blast" has been defined (Zuckerman) as the wave of compression and suction which is set up by the detonation of high explosives.

Pressures are highest in the region of explosion (zone of brissance) and fall off rapidly. The compression phase is always of greater intensity than the suction phase, although the latter is of longer duration. Thus, although positive pressures may be quite great immediately adjacent to the charge, the negative pressure can never exceed 15 lbs. per sq. in. since this would amount to a perfect vacuum. Actually the negative phase seldom exceeds 4 - 5 lbs. per sq. in. It is, therefore, generally conceded that injury from blast is brought about through the positive wave, as it impinges upon the body.

Although the duration of the positive blast wave has been found to last for several thousandths of a second the duration of the peak pressure is for but a small fraction of a millisecond. The negative or "suction" wave may last for several hundredths of a second. The velocity and duration of the pressure wave at any given point are such that a body as large as a man would be completely immersed for an instant in a wave of almost uniformly raised pressure.

Sutherland considers blast to be simply an excessively intense sound wave. It travels (beyond the zone of brissance) with the speed of sound both in air (1080 f.p.s.) and in water (4800 f.p.s.). It is reflected as is a sound wave, increasing in intensity by almost 100 per cent when directly reflected from a vertical surface.

The concussion wave travels through the charge (T.N.T.) at about 25,000 f.p.s. and the "flame front" of incandescent gases rushes outward at approximately 7,000 f.p.s. The latter figure is in agreement with recorded velocities of very minute shell fragments.

It should be pointed out that we are here concerned with injury due to pure blast, uncomplicated by missiles or the projection of the body against surrounding objects. Practical experience has shown that such a condition seldom exists and that casualties resulting from explosions are usually characterized by terribly mutilating injuries produced by missiles as well as extensive burns.

Injury from falling walls, flying glass, etc., may be thought of as indirect blast injury. The blast wave may set up oscillations or vibrations in buildings causing their walls to vibrate as a diaphragm and often to fall. Statistically such injuries far outnumber those due directly to the impact of the positive wave of the blast or the individual.

Blast pressures in air are difficult to record. In the past the Williams gauge has been used extensively to record them; and because of its convenience it is still employed to some extent. Paper gauges, in which the blast pressure

is calculated from the diameter of the paper membrane which may be ruptured also are used. Piezo-electric gauges employ an oscilloscope and are the most accurate gauges at present obtainable, but are said not be ideally suited to recording blast pressures of low intensity. Blast pressures in air may be estimated also by mathematical formula to an accuracy of within approximately $\pm$ 10 per cent; but only by piezo-electric gauges, with oscilloscopes, can the duration of the various phases of the blast wave be accurately determined.

Pathology: In both animals and man, death from blast is apparently brought about by extensive hemorrhage from the pulmonary capillaries into the aveoli of the lungs, and such bleeding may be so severe as to occlude the bronchi and even the trachea. In some instances massive hemorrhage into the pleural cavities is seen. In this respect all reports available on the effect of blast on human beings are in complete agreement: intrapulmonary capillary hemorrhage being the universal pathological finding. Thus, Hadfield et al regarded this as the "only gross anatomic lesion" invariably present in such cases, while Hadfield and Christi found that men dying some days after exposure to blast showed pulmonary consolidation surrounded by deep zones of recent bleeding, and point out that such areas probably continue to bleed for some time.

O'Reilly and Gloyne reported 17 blast cases and stated that bulging of the lower chest wall was a characteristic finding. Dean et al reviewed 27 cases who survived exposure to blast, and found consolidation, diminished air entry, impaired resonance, crepitations and yellowish sputum, all indicative of pulmonary lesion.

Recent observations indicate that intestinal perforation, so often observed in cases of underwater concussion, may result also from air blast when there is sufficient pressure. (Greaves et al.)

We may thus summarize the pathological findings in cases of "pure blast" as follows:

1. Pulmonary damage, consisting of rupture of capillary walls, with interstitial bleeding; destruction of aveolar epithelium; and rupture of the larger pulmonary vessels with massive hemorrhage into the bronchi, trachea and pleural cavities.

2. Hemorrhage within the gastrointestinal wall, with subsequent necrosis and perforation; immediate frank perforation of the gut.

3. Rupture of the eardrum. Occasional reports have been made attributing injury to the internal ear, retina, testes and other structures to air blast, but these isolated accounts have not been confirmed by animal experimentation.

Protection: Methods suggested for the protection of personnel from air blast injury have centered in garments designed to prolong the deceleration of the blast wave, or to deflect it, as it comes in contact with the body. The use of padded garments or those made of sponge rubber has been recommended on the basis of theory and the results of animal experimentation.

Treatment: In the treatment of casualties attributable to air blast it should be noted that artificial respiration is definitely contraindicated as it may increase the pulmonary hemorrhage; early movement of the patient is hazardous for the same reason. Plasma administration may increase pulmonary hemorrhage and the tendency to pulmonary edema. The administration of oxygen is recommended. Therapy should, therefore, consist of those supportive measures of recognized value in pneumonia. The patient exhibiting signs of abdominal injury should be treated conservatively, unless signs of frank perforation are apparent, in which case surgery is of course necessary. Sulfonamides may be administered in an effort to avoid secondary pneumonia or peritonitis.

Discussion: From the above it may be seen that a large amount of interest has centered in blast injury and that its pathology is well known. However, the relative importance of this type of injury must be evaluated by the medical officer on the basis of its frequency, the practicability of protection against it and its incidence, uncomplicated by other and more serious injuries.

In general, it may be said that explosions result in burns and also in injuries caused by mutilating missiles. The immediate and definitive treatment of these injuries and burns will take precedence over the treatment of injury from blast.

It has, moreover, been found that men exposed to blast, who by chance escape missile injury, may suffer extensive burns without any injuries from the blast. These observations have been confirmed in animal experiments, where cats and rabbits were exposed in fabric harness, at such distances that no pulmonary injury took place, yet sufficiently close to the charge so that the harness and body fur were repeatedly singed or set on fire by the "flame front." It is, therefore, considered as demonstrated that in order to incur injury from blast (in the open) a man must be so close to the exploding charge that he will be within the flash area. It was further found that animals repeatedly exposed to blast showed pronounced reflex inhibition, with sluggish responses to pinching, absence of placing, equilibratory, pinna, corneal and other reflexes. Upon sacrifice and post-mortem, however, the lungs of these animals were found either to be entirely clear or to present minimal petechial lesions.

The question has often been raised as to how much air blast pressure can be tolerated without injury. This cannot as yet be stated with authority since the recording of pressures when men are accidentally subjected to blast is merely fortuitous and no controlled experimentation is possible. Such data

as we have indicate that the unprotected tympanum is probably the most vulnerable of structures and may rupture at pressures around 10 lbs. per sq. in. The use of ear defenders, or merely placing the hands over the ears, would of course protect against much higher pressures. Injuries which may be inflicted upon the inner ear (organ of Corti) are more difficult to evaluate, since deafness due to organic lesion is often difficult to differentiate from hysterical deafness.

Since the above considerations reveal that men or animals sufficiently close to an exploding charge to receive serious pulmonary or gastrointestinal lesion from the blast will be within the flash area, and since personnel within this area will most probably receive one or more missiles, the relative unimportance of "blast" under actual service conditions becomes apparent. Certainly any protective covering as a means of reducing the impact of the blast wave, which does not offer protection against missile injury, cannot be considered as practical or desirable. Blast injury uncomplicated by serious wounds from missiles will probably remain a rarity. The true dangers from explosions are those from flying missiles, burns, falling walls and debris and the projection of the body against unyielding and irregular surfaces. That death may result from the effects of "pure blast" is not denied, but this hazard may not be looked upon as one commonly met with. These conclusions refer to air blast in the open, but one must bear in mind that explosions may generate truly great pressures within confined spaces and in underwater concussion. The last is an ever present threat at the site of Naval actions. (E.L.C.)

References: Greaves, F.C. et al, U. S. Nav. M. Bull., 41: 339, '43.
Hadfield, G. et al, Lancet, 2: 478, '40.
Hadfield, G. and R.V. Christie, Brit. M. J., 1: 77, '41.
O'Reilly, J.M. and S.R. Gloyne, Lancet, 2: 423, '41.
Sutherland, G.A., Lancet, 2: 478, '40.
Zuckerman, S., Proc. Roy. Soc. Med., 34: 31, '41.

* * * * * *

Change in Army Typhoid Immunization Regulations: The December 1943 issue of the Bulletin of the U.S. Army Medical Department reports the following changes in typhoid immunization regulations:

1. Revaccination against typhoid and paratyphoid is to be accomplished by the subcutaneous administration of 0.5 c.c. of triple typhoid vaccine.

2. All who have received the basic series of 3 injections will be given this 0.5 c.c. stimulating dose annually henceforth.

3. No exemption to revaccination is to be made because of age.

4. Any exemptions to this regulation will be based on the presence of "definite medical contraindications" to this immunization.

* * * * * *

Instructions for antityphoid vaccination of Naval personnel remain unchanged. Annual stimulating injections are given intracutaneously, 0.1 c.c. of the triple typhoid vaccine being used.

* * * * * *

Post-War Implications of Fluorine and Dental Health: At the recent convention of the American Public Health Association in New York City the following points were made with regard to the possible use of fluoride in drinking water:

1. Dean, of the United States Public Health Service, stated that school children who used domestic waters containing as little as 1 p.p.m. of fluoride experience only about one-third to one-half as much dental caries as do comparable groups using water which is free of fluoride.

2. Faust, a water-works engineer of the Michigan State Department of Health, stated that application of sodium fluoride to water supplies deficient in fluoride would be both cheap and easy using chemical feeding equipment of types already in use.

3. Knutson, of the United States Public Health Service, stated that adding fluoride to drinking water would hold promise of caries prophylaxis only for future generations since it must operate during the calcification and growth period of life in order to be effective. For our present population he recommended the topical application of fluoride to the teeth for its caries-prophylactic effect.

4. Gruebbel, director of the Division of Public Health Dentistry, Missouri State Board of Health, pointed out that the discovery of the fact that a fluoride concentration of 1 p.p.m. in the drinking water will materially reduce the incidence of dental caries (if used during the period when the teeth are being calcified) offers extremely important possibilities from the public health point of view. It should serve to bring the yearly incidence and accumulation of dental caries within a range where it can be more adequately dealt with by dental treatment service. (D.F.S.)

* * * * * *

Pneumothorax and Altitude is the subject of an item of interest to all medical officers which appears in the Aviation Supplement of January 21, 1944. It describes experimental work carried out recently in England by Todd and Anderson. The conclusions reached are as follows:

1. If possible, no patient with a wound of the chest causing pneumothorax should go above 4,000 feet if transported by air to the base. If it is necessary to go to greater heights, the pressure should be adjusted by removing as much air from the pleural cavity as possible before the start of the journey.

2. In cases of tension-pneumothorax due to escape of air through a lacerated lung, it will be necessary to place a needle or an intercostal cathether in position in order to control the pressures during the flight. Personnel with artificial pneumothorax should not fly above 6,000 feet for any length of time and should not, even for a few minutes, go above 8,000 feet.

3. Those with a mobile mediastinum appear to stand altitude better than those with adhesions or a fixed mediastinum. In the latter there is always danger of rupture of an adhesion.

4. By disregarding the underlying lesion in the lung in a case of therapeutic pneumothorax and removing most of the air before the ascent, it is possible to allow the patient to fly higher; but this practice is to be deplored since expansion of a lung collapsed by therapeutic pneumothorax is likely to exacerbate the underlying disease. If a patient with therapeutic pneumothorax must undertake a flight up to 8,000 or 10,000 feet, he should go just before a refill is due and not immediately after one. (Lancet, Nov. 13, '43.)

* * * * * *

The Red Cross Blood Donor Service: On a number of occasions Medical Officers have requested blood plasma from the American Red Cross. Such requests are based largely upon misunderstanding of the functions of the Red Cross Blood Donor Service.

The Red Cross Blood Donor Service is the only official agency through which the public may donate blood to the Army and Navy for the production of dried plasma and albumin for use solely by the Army and Navy.

All blood procured by the Red Cross Blood Donor Service is delivered immediately to commercial biological laboratories where it becomes the property of the Army and Navy. The blood is processed into dried plasma or serum albumin for use in the Armed Forces overseas and afloat. The Red Cross is charged with the responsibility of collecting the blood and shipping it to the commercial laboratories. However, it has no jurisdiction over the plasma or albumin and therefore does not have plasma available to distribute to ships or stations.

The commercial biological laboratories are licensed by and are under the strict supervision of the National Institute of Health. All blood substitutes accepted from these firms undergo rigid laboratory and clinical tests prior to acceptance in order to assure the Navy of safe and satisfactory blood substitutes. Numerous small laboratories have expressed a desire to furnish the Navy with plasma. The technics used in some of these smaller laboratories are above reproach while the methods used by others are considerably below standard.

Properly prepared plasma is an excellent lifesaving therapeutic agent; however, improperly prepared plasma can produce serious consequences. Medical officers should not, except under dire emergency, obtain plasma from other than official sources. (L.R.N.)

* * * * * *

Special Publications Available on Request: The Bureau has a limited number of the following publications for distribution to medical officers specifically requesting them: (1) "Molluscan Intermediate Hosts of the Asiatic Blood Fluke, Schistosoma Japonicum, and Species Confused with Them," by Paul Bartsch, published by the Smithsonian Institution; (2) "The Feeding Apparatus of Biting and Disease-Carrying Flies: A Wartime Contribution to Medical Entomology," by R. E. Snodgrass, published by the Smithsonian Institution.

* * * * * *

Public Health Report:

Disease	Place	Date	Number of Cases
Dengue	Honolulu, T. H.	Nov. 27-Dec. 4, '43	62
Plague	Azores	Year 1943	54
	Belgian Congo	Oct. 25-Nov. 1, '43	11 (10 fatal)
	Ecuador	Oct. 16-31, '43	2 (1 death)
	Egypt, Suez	Nov. 13-20, '43	12 (4 deaths)
	Madagascar	July 1-Oct. 31, '43	13
	Morocco	Nov. 1-10, '43	4
Smallpox	Algeria	Oct. 11-20, '43	51
	Indochina	Oct. 21-31, '43	76
		Nov. 1-10, '43	56
Typhus Fever	Algeria	Oct. 11-20, '43	23
	Bulgaria	Oct. 1-Nov. 10, '43	33
	France	September 1943	1
	Guatemala	October 1943	145 (22 deaths)
	Hungary	Nov. 14-20, '43	7
	Irish Free State	Nov. 6-13, '43	1
	Rumania	Nov. 16-23, '43	81
	Slovakia	Nov. 6-13, '43	31
Yellow Fever	Colombia	October 1943	5 (5 deaths)

(Pub. Health Rep., Dec. 17 & 24, '43.)

To: All Ships and Stations.

BUMED-X-AMM-II
P11-1/A16-3(103)

Subj: Prevention and Treatment of Casualties from Non-Persistent War Gases.

6 January 1944

1. The following material is based on recent recommendations submitted to the Surgeon General by the Committee on Treatment of Gas Casualties of the Division of Medical Sciences, National Research Council.

I. PHOSGENE AND DIPHOSGENE

A. Recognition:

1. Casualties from phosgene and diphosgene present essentially the same symptoms and require identical measures of treatment. The odor of each suggests musty or burned hay, silage, or green corn. Their presence makes smoking disagreeable.

B. Protection:

1. The gas mask protects. Hold the breath instantly on detection, apply mask, and exhale as completely as possible. S P E E D is absolutely essential.

C. Effects on the Body:

1. Phosgene and diphosgene injure the lungs and irritate the eyes, nose and throat, but have no effect on the skin.

D. Signs and Symptoms:

1. Immediate: There may be no symptoms but usually there are varying degrees of dryness of the throat, coughing and choking, tightness across the chest, transient slowing of the pulse, headache, nausea, and at times smarting and watering of the eyes.

2. Later: Regardless of the severity or mildness of the initial symptoms, pulmonary edema may or may not develop 2 - 24 hours after the exposure. Developing edema is indicated by flushing of the face, shallow rapid breathing, rales throughout the chest, hacking and painful cough, frothy sputum and cyanosis. Weak heart action, low blood pressure, clammy skin, and ashen color may follow, presenting a shock-like picture with a grave prognosis.

E. Treatment:

1. First Aid:

(a) Protect from further exposure to gas by immediate application of mask.

(b) Moderate activity is permissible while there is no evidence of pulmonary edema. However, absolute rest is mandatory when pulmonary edema is present as shown by respiratory distress.

(c) Blankets and hot drinks may be given to keep the patient comfortably warm. Excessive application of heat is to be avoided.

2. Specific Therapy:

(a) Oxygen should be given in as high a concentration as possible to relieve cyanosis. Expiration against positive pressure from 1 to 6 cm. of water may be tried if the latter measure is not effective.

(b) Sedation: If oxygen fails to quiet the patient, morphine (gr. 1/6 - 1/4) should be used providing respiration is not greatly depressed. Codeine is useful to relieve cough.

(c) Chemotherapy: Sulphadiazine should be given for the prevention of pulmonary infection as soon as the edema begins to subside as evidenced by the improvement in the patient's general condition. An initial dose of 2 grams should be followed by 1 gram every six hours for from 5 to 7 days until the threat of infection has passed. During the time sulphadiazine is being given, attention should be directed to the water intake and urinary output. The latter should not be less than 1 liter per day. A neutral or slightly alkaline urine must be maintained by the administration of 2 grams sodium bicarbonate every four hours.

(d) Venesection: This procedure cannot be recommended. There is no proof that it is beneficial and it is distinctly harmful during the shock-like state.

E. Other Measures:

1. Expectorants are of no value in the acute phase of pulmonary edema. Intravenous fluids are contraindicated. Cardiac and respiratory stimulants are of little value.

F. Convalescent Care:

1. Absolute rest must be continued as long as pulmonary edema persists. Activity may be resumed gradually on its disappearance.

G. Prognosis:

1. Recovery usually follows if the patient survives 48 hours after exposure.

II. CHLORINE

A. Recognition:

1. Chlorine is an irritating, easily visible, greenish-yellow gas with an odor like chloride of lime.

B. Protection:

1. The gas mask protects. Hold the breath instantly on detection. Apply the mask and exhale as completely as possible. S P E E D is absolutely essential.

C. Effects on the Body:

1. Chlorine is extremely irritating to the eyes, nose and throat on relatively heavy exposure. It devitalizes the lining membrane of the air passages which may slough and cause obstruction. With sufficient exposure pulmonary edema follows immediately.

D. Signs and Symptoms:

1. Coughing, dryness of nose and throat, tightness across the chest, smarting and watering of the eyes follow immediately on exposure and continue as pulmonary edema appears. The signs and symptoms of this edema are similar to those in phosgene poisoning, but are much more frequently followed by those of broncho-pneumonia.

E. Treatment:

1. The treatment is the same as that outlined under Phosgene;.Sulfonamides are definitely indicated as soon as the condition of the patient allows. In addition, the irritation of the eyes and nose may be relieved by irrigation with water or 2 per cent sodium bicarbonate solution followed by the instillation of anesthetic eye drops.

F. Prognosis:

1. See Phosgene.

III. HYDROCYANIC ACID

A. Recognition:

1. Hydrocyanic acid is a clear colorless liquid. It volatilizes very rapidly and the odor of the resulting gas resembles that of peach kernels or bitter almonds.

B. Protection:

1. The gas mask protects for a limited period. Hold the breath instantly on detection, apply mask and exhale as completely as possible, S P E E D is absolutely essential.

2. Spraying with water will remove cyanide from the air of confined spaces.

C. Effects on the Body:

1. The effects of hydrocyanic acid usually result from inhaling the gas, less frequently from absorption through the skin or gastrointestinal tract. Paralysis of the respiratory center terminates in death unless treatment is immediate.

D. Signs and Symptoms:

1. Exposure to low concentrations causes giddiness, headache and slow lapse of consciousness.

2. Unconsciousness, convulsions and death rapidly follow exposure to high concentrations.

E. Treatment:

1. Treatment, to be effective, must be IMMEDIATE AND DETERMINED; Life depends upon instant action, i.e., a matter of seconds.

2. Fresh air is lifesaving. If not immediately available, put on mask.

3. Coma or convulsions require AMYL NITRITE. Crush a pearl in its cloth container and place over nose or insert under mask. If necessary this may be repeated. WARNING: A fully conscious person cannot tolerate amyl nitrite under his mask.

4. Artificial respiration, in addition to (2) and (3), must be applied if breathing has stopped.

5. If it is not immediately reestablished, give intravenously alternate doses of the following antidotes where available -

(a) Sodium Nitrite (0.3 to 0.5 grams) in 10 to 15 cubic centimeters of water over a period of three minutes.

(b) Sodium Thiosulphate (25 grams) in 50 cubic centimeters of water over a period of ten minutes.

Epinephrine should be employed, if necessary to combat excessive fall in blood-pressure produced by either nitrite given.

6. If liquid HCN has been swallowed, immediately wash out the stomach with a pint of potassium permanganate in 1:1000 aqueous solution, and give intravenous sodium nitrite followed by sodium thiosulphate as above outlined under (5).

IV. CYANOGEN CHLORIDE

A. Recognition:

1. Cyanogen chloride is a clear colorless liquid even more volatile than hydrocyanic acid. It irritates the nose and throat and produces lacrimation even in relatively low concentrations.

B. Protection:

1. The gas mask protects for a limited period. On detection, instantly hold the breath. Apply mask and exhale as completely as possible. S P E E D is absolutely essential.

C. Effects on the Body:

1. The effects of cyanogen chloride combine those of cyanogen and chlorine. Cyanogen chloride, like hydrocyanic acid gas, is absorbed through the lungs and causes rapid failure of respiration as in the case of hydrocyanic acid. The contained chlorine immediately irritates the eyes and damages the respiratory tract.

D. Signs and Symptoms:

1. The acute signs and symptoms resulting from the cyanide component in the gas are giddiness, headache and, in severe exposures, unconsciousness and death.

2. Coughing, dryness of the nose and throat, tightness across the chest, smarting and watering of the eyes result from the chlorine component in the gas. As with chlorine gas pulmonary edema follows severe exposures.

E. Treatment:

1. Treatment must be immediate and determined.

2. Fresh air or instant application of the mask is lifesaving.

3. If breathing continues, recovery will probably occur without any specific therapy.

4. Combat the cyanide effect by:

(a) Inhalation of amyl nitrite fumes for convulsions and/or coma, as directed for HCN gas.

(b) Artificial respiration if breathing has stopped.

(c) If these measures fail give alternate doses of sodium nitrite and sodium thiosulphate intravenously as directed for HCN.

5. Combat the chlorine effect by:

(a) Irrigation of the eyes, nose and throat to relieve irritation.

(b) Codeine to relieve cough.

(c) Oxygen in as high a concentration as possible to relieve the cyanosis of pulmonary edema as directed for phosgene poisoning.

(d) Sulfonamides to prevent pulmonary infection, as directed for phosgene poisoning. --BuMed. Ross T. McIntire.

* * * * * *

To: All Ships and Stations. BUMED-T4-DLS
A4-1/FS(122)

Subj: Microscopes, Issue of to Vessels. 14 December 1943

1. The procurement of microscopes has improved to the extent that the following listed items will be included, in the future, in medical commissioning outfits furnished DD's and in the special outfit furnished medical officers of DE divisions:

Stock No.	Item Title	Unit	Quantity
5-106	CASE A, microscopical Outfit (without darkfield condenser)	one	1
5-110	CASE B, Microscopical Outfit	one	1
5-225	LAMP, Microscope	one	1

2. Provided a microscope has not been previously obtained and if the need is considered adequate, medical officers attached to DD's, APD's and DE divisions now in commission, may submit a NavMed Form 4 requisition direct to the Bureau of Medicine and Surgery, Materiel Division, Sands and Pearl Streets, Brooklyn 1, New York, for above items. --BuMed. L. Sheldon, Jr.

* * * * * * * * * *

To: All Ships and Stations. BUMED-B-DLS
A2-2/EN10(113-38)

Subj: Manual of the Medical Department--
Change Number 2. 6 December 1943

1. Paragraph 2282(e) is revised to read as follows:

"(e) No forms, reports, photographs, or other papers shall be attached to, or inserted in a health record with the exception of the current report of the aviation physical examinations (NMS Av-Form 1), bearing the endorsement of the Chief of the Bureau of Medicine and Surgery, which may be folded and inserted within the covers of the health record without permanent attachment thereto."
--BuMed. L. Sheldon, Jr.

* * * * * * * * * *

To: All Ships and Stations. BUMED-Cc-ERP
P3-2/P16-5(074-42)

Subj: Payment for emergency medical, dental and hospital treatment of naval personnel outside the United States. 21 December 1943

Refs: (a) Paragraph 3045, Manual Medical Department.
(b) Article 1396(4), N. R.
(c) Article 1607(5), N. R.
(d) Article 1189, N. R.
(e) Paragraph 3162, Manual Medical Department.

1. Reference (a) is quoted below for the information of all concerned, particular attention being invited to the instructions in subparagraph (d) regarding payment of bills for medicines or for civilian medical, dental, nursing, or hospital services, incurred outside the United States.

"Local Purchase, Medicines and Civilian Medical, Dental, Nursing and Hospital Services.--(a) Medicines and civilian medical, dental nursing, and hospital services, for Navy and Marine Corps personnel on duty, may be procured at the places and in the manner in which such articles are usually bought and sold, or services engaged, between individuals (41 U.S.C. 5), when all of the following conditions exist:

(1) The member of the naval service for whom the medicine or service is required must be on duty.
(2) When the material required is not available from naval or other sources owned by the United States, or when the services or facilities of physicians, dental surgeons, nurses, or hospitals, employed or operated by the United States, are not available.
(3) Immediate delivery or performance is required for the proper care and treatment of the patient.
(4) Procurement must be authorized by the commanding officer or by the Navy Department.

(b) Prompt report (NAVMED-Form U), in the manner prescribed by paragraph 3162, Manual Medical Department, shall be made in each instance of local procurement of medicines or civilian medical, dental, nursing, or hospital services.
(c) Bills for medicines or civilian medical, dental, nursing, or hospital services, incurred within the United States, in the manner authorized, shall be forwarded to the Bureau for payment (par. 3167, Man.Med.Dept.)
(d) Bills for medicines or civilian medical, dental, nursing, or hospital services, incurred outside the United States, in the manner authorized, shall be paid by the local Navy activity when possible; otherwise the bills shall be forwarded to the Bureau for payment."

2. Authority for local payment in foreign ports by activities afloat is contained in reference (b), and by activities ashore in reference (c).

3. The expenses defrayed locally in foreign countries should be limited to those expenses incurred for emergency treatment and should not include expenses for services of an unusual or special nature, for which there would obviously be time to obtain the prior authority of the Bureau of Medicine and Surgery. Expenses may not be defrayed locally for prosthetic dental treatment, including the use of precious metals and the replacement of teeth, for which the prior authority of the Bureau of Medicine and Surgery is required by Navy Regulations (reference d).

4. After payment of emergency expenses has been made from the appropriation "Medical Department, Navy," a copy of each public voucher, a copy of each receipted bill, and a NAVMED Form U report, in duplicate, in each case as required by references (d) and (e) should be forwarded to this Bureau.

--BuMed. Ross T. McIntire.

* * * * * * * * * *

AVIATION CIRCULAR LETTER NO. 2-44

Op-34-I/ab
Ser. 50934

To: All Naval Aviation Activities.

5 January 1944

Subj: Medical Abstract, duplicate of; personnel enroute overseas destinations via air.

1. As a result of failure to satisfy clearance authorities with proper evidence of immunization against certain diseases, flights for overseas destinations have been seriously impaired by the delay experienced in obtaining clearance for personnel.

2. Commanding Officers shall assure that prescribed immunizations are given and records (Medical Department Form H-3) maintained in accordance with established Medical Department procedures.

3. Commanding Officers are directed to take positive steps to insure that the crew and passengers of planes have in their possession duplicates of these forms properly prepared and available for examination prior to departing from Continental United States for overseas destinations.

--CNO. F. B. Wagner.

* * * * * * * * * *

To: BuPers; MarCorps; ComNavNAW;
ComOne; ComThree; ComFour; ComFive;
ComEight; ComTen; ComEleven; ComTwelve.

BUMED-Y-HS
P2-3/P3-1(012-41)

4 January 1944

Subj: Malaria Indoctrination of Personnel Departing for Malarious Areas.

Ref: (a) OP-30P2-ler(SC)P2-3/FF20 Dec 101152, Serial 0836030 of 8 December 1943.

1. In compliance with Ref. (a), malaria training manuals and posters have been obtained in sufficient quantities to have all personnel, destined for malarious areas overseas, instructed in those phases of malaria control pertaining to personnel, particularly in the value of personal protection against mosquitoes.

2. To make effective the experience gained in the South Pacific instruction of this type must be on a continuing basis. All addressees are requested, therefore, to initiate indoctrination of all subject personnel and to require certification when this has been accomplished.

3. The Bureau of Medicine and Surgery considers malaria-indoctrination organization and uniformity of instruction of paramount importance and recommends that addressee commands appoint a senior malaria-indoctrination officer, preferably a qualified staff medical officer, to establish and supervise the district or area indoctrination program. Such senior malaria-indoctrination officers should designate qualified local malaria-indoctrination officers in all commands where personnel are in training for, or awaiting assignment to, duty in malarious areas; they should maintain a roster of their respective indoctrination officers by unit address, distribute educational material and report organization outline, instruction personnel, and progress to BuMed via addressee commands. The Bureau of Medicine and Surgery further recommends that this duty be considered as additional to present assignment.

4. The following brochures and posters have been procured in sufficient quantity for present needs, and 75 per cent additional for future use, for distribution to addressees for further distribution within their commands to meet local requirements as indicated below:

(A) Prevention of Malaria in Military and Naval Forces in the South Pacific (NavMed 141)--one for each medical officer.
(B) Military Malaria Control in the Field (NavMed 142)--one for each officer.
(C) Malaria Mosquitoes and Man (NavMed 143)--one for each man.
(D) Malaria posters (3)--for general distribution at all personnel assembly depots.

--BuMed. Ross T. McIntire.